REVISED 01/09

LSUE COURSE SYLLABUS

I.	**Chemistry 2262**	**Instructor: Chemistry Faculty**

II. Course description from the current LSUE catalog:

Organic Chemistry. Lec. 3; Cr. 3.
Continuation of Chemistry 2261.
Prerequisite: Chemistry 2261.

III. Textbook(s) and other required materials:

Organic Chemistry, 6th ed. by Morrison and Boyd, Allyn and Bacon, Prentice Hall, Inc.
Study Guide to accompany above is optional.

IV. Evaluation/grading (policy and basis; number and frequency of tests and papers; weights of particular tests or papers; etc.):

Three one-hour tests and one ACS* final exam are given, each worth 100 points. Tests are written to a 10-point scale and normalized grades are assigned on that basis. **All tests aim at the application of knowledge.** The majority of the points available on tests will be from problems/questions involving synthesis, analysis, and using mechanisms to predict products.

*The final exam will be an American Chemical Society generated multiple-choice exam. It will be comprehensive over two semesters, and is graded based on national percentiles of students across the nation with the same general background in organic chemistry.

V. Policies pertaining to attendance, late work, make-up work, etc.:

Students are expected to attend every lecture due to the fact that the lectures are extremely important to the understanding of the material, and that most of the students are in competitive admission curricula. Attendance for tests, which are announced at least a week in advance, is mandatory. Any student with a mitigating circumstance which absolutely prohibits being present for a test must get in touch with the instructor. If the excuse is acceptable and verified, a final grade will be assigned without that test.

VI. Course objectives:

Students should:

Learn the type of thinking skills that are of particular value in predicting the synthesis of organic compounds.

Use critical thinking skills to solve organic word problems and apply theory within the scope of an introductory organic chemistry course.

Exhibit the proper understanding and use of organic vocabulary and nomenclature in discussing problems.

VII. Major instructional objectives:

Students should be able to:

1. Discuss dienes, alkynes and alicyclic hydrocarbons with respect to their characteristic reactions.

Show, mechanistically, what allylic rearrangement is in terms of free-radical substitution in conjugated alkenes.

Illustrate how the resonance effect applies to carbocation stability.

Predict the effect of conjugation on the structure and properties of dienes.

Predict orientation and reactivity of free-radical addition to conjugated dienes.

Outline the mechanism of electrophilic addition to alkynes

Apply the use of metal acetylides as intermediates in synthesis.

Compare and contrast torsional strain, angle strain, and steric strain.

Locate axial and equatorial bonds in chair cyclohexane.

Discuss stereoisomers in terms of cyclic compounds.

2. Discuss aromaticity in terms of the Huckel 4n + 2 rule and relate this to electrophilic aromatic substitution.

Predict aromatic character of compounds using the Huckel 4n + 2 rule.

Draw the structure of various aromatic compounds from their names

Write mechanisms for various electrophilic aromatic substitution reactions.

Use activating/deactivating effects of substituents to predict reaction rates at each aromatic ring position.

Use directing effects of substituent groups to predict orientation of an incoming group based on the classification.

Understand structure, preparation and reaction mechanisms of arenes.

3. Discuss carbonyl groups with respect to their characteristic reactions.

Understand methods of preparation and properties of aldehydes, ketones and carboxylic acids.

Be familiar with the mechanisms of reactions of carbonyl compounds.

Relate acid strength of carboxyl groups to substitutuents.

Discuss the properties and reactivities of carboxylic acid derivatives.

4. Discuss the basic nature and utility of organic amines.

Understand the structure, preparation, and properties fo amines

Predict the effect of substituents on the basicity of amines.

Compare reactivities of amines in various reactions

Utilize diazonium salts as a synthetic intermediate.

VIII.	Brief summary of course content by major units of instruction:

1. Alkynes and Dienes
    a. Structure, Nomenclature, and Physical Properties
    b. Preparation, Reactions, and Reactivity
    c. Reaction Mechanisms, Effect of Delocalization
    d. Alkynes in Synthesis
2. Cyclic Aliphatic Hydrocarbons
    a. Structure, Nomenclature, and Physical Properties
    b. Preparation and Reactivity
    c. Factors Affecting Stability of Conformations
    d. Stereoisomerism of Cyclic Compounds
3. Resonance and Aromatic Character of Benzene
    a. Resonance Structure of Benzene
    b. Aromatic Character. The Huckel 4n + 2 Rule
    c. Physical Properties and Nomenclature of Benzene Derivatives
4. Electrophilic Aromatic Substitution
    a. Effect of Substituent Groups in Determination of Orientation
    b. Mechanisms of Various Types of Electrophilic Aromatic Substitution
5. Aromatic-Aliphatic Compounds—Arenes and their derivatives
6. Aldehydes and Ketones
    a. Structure, Nomenclature, Physical Properties, and Preparation
    b. Reactions
    c. Analysis
7. Spectroscopy and Structure
    a. Electromagnetic Spectrum and Ultraviolet Spectroscopy
    b. Infrared Spectroscopy
    c. Nuclear Magnetic Resonance Spectroscopy
    d. Mass Spectroscopy and Other Spectral Methods of Analysis
8. Carboxylic Acids and Their Salts
    a. Properties, Structure, and Nomenclature
    b. Nucleophilic Acyl Substitution and Condensation Reactions
    c. Acid Chlorides, Acid Anhydrides, Amides, and Esters.
9. Amines and Diazonium Salts
    a. Structure, Nomenclature, Preparation, and Physical Properties
    b. Reactions
    c. Synthesis Using Diazonium Salts
10. Fats
    a. Occurrence and Composition of Fats
    b. Hydrolysis of Fats—Soaps and Micelles
    c. Fats as sources of pure acids and alcohols
    d. Detergents, Phosphoglyderides, Phospholipids
11. Carbohydrates
    a. Monosaccharides and stereoisomers of (+)-Glucose and (-)-Fructose
    b. Configuration (+)-Glucose—the Fisher Proof

c. Disaccharides and Polysaccharides
d. Structure of Cellulose
e. Reactions of Cellulose

12. Amino Acids and Proteins
    a. Structure of Amino Acids
    b. Amino Acids as Dipolar Ions
    c. Isoelectric Point of Amino Acids
    d. Peptides and Determination of Structure of Peptides
    e. Proteins—Classification and Function
    f. Structure of Proteins

IX. Methods of instruction:

Lectures and discussion of the material with students are used. Problem sessions are scheduled when needed. Online readings, exercises, practice quizzes, and drills will be made available on the MyCourses webpage for the course on an ongoing basis.

X. Brief overview of special instructions:

Students are encouraged to form study groups, to attend any extra problem sessions and office hours with the instructor, and to work with models. They are also referred to the Tutorial Center on campus when an organic chemistry tutor is available. Daily visits to and extensive utilization of the MyCourses webpage are very strongly advised, and may be required at the discretion of the instructor.

XI. Bibliography of supplemental references and/or source materials:

The Handbook of Chemistry & Physics. Chemical Rubber Co., Pub. 1990.

ADS Americans with Disabilities Act) Statement

Any student who is a “qualified individual with a disability” as defined by Section 504 of the Rehabilitation Act and Title II of the ADA, and who will need accommodated services (e.g., note takers, extended test time, audiotape, tutorials, etc.) for this course must register and request services through the Office of Academic Assistance Programs, S-150.

CSD CODE OF STUDENT CONDUCT

LSUE enforces discipline on campus to protect the academic environment of the campus and the health and safety of all members of the University community. To accomplish this objective, the University enforces standards of conduct for its students. Students who violate these standards can be denied membership in the LSUE community through imposition of disciplinary sanctions.

The LSUE Code of Student Conduct can be found on the LSUE website (lsue.edu). Follow the “Current Students” link from the homepage, and then click on “Student Handbook.”